RESEARCH FUNDING AT ALBERTA UNIVERSITIES

1998/1999 REPORT

JUNE 2000

UNIVERSITY RESEARCH AND
STRATEGIC INVESTMENTS BRANCH

Alberta
INNOVATION AND SCIENCE

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Introduction
University Research in Alberta

THE ROLE OF UNIVERSITY RESEARCH

University research is a vital part of Alberta's innovation system. The research conducted at Alberta's universities is an integral part of the university educational experience and contributes significantly to the social and economic development of the province.

Research conducted at Alberta's universities:

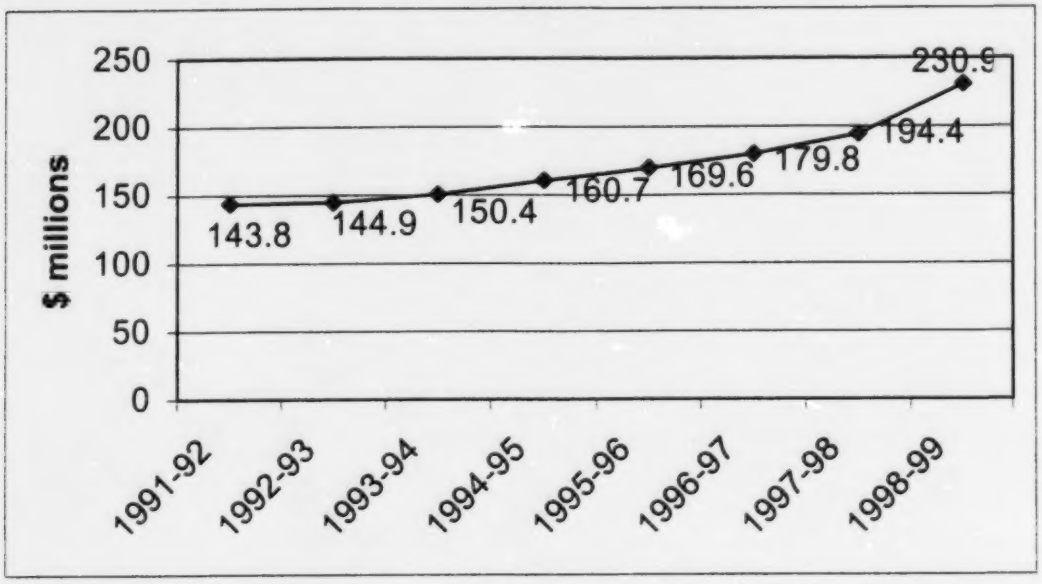
- creates new knowledge that adds to the existing body of understanding;
- disseminates knowledge to inform and enhance learning;
- contributes to the training of highly qualified personnel, including the next generation of university researchers as well as knowledge workers for industry;
- contributes to the social, cultural and economic well-being of the province and of individual Albertans.

Given the rapid pace of economic and technological change, innovation has become central to economic competitiveness and quality of life concerns. University research is a key part of the innovative process. Not only does the research conducted in our universities contribute to the search for innovation in terms of discovery, it also contributes to the development of people with the scientific knowledge and problem-solving skills that can be applied in a wide range of industries.

Within the university system, research and learning are intricately linked. The key output of a university is its graduates and the skills and knowledge that they possess. In the university sector, research is a fundamental element in the development of these skills at both the graduate and the senior undergraduate level. In addition, the success of a university in its research role is a key determinant in attracting the resources, both in terms of people (quality faculty and students) and infrastructure support, that serve to improve the quality of both the institution's research and educational programs.

Total Sponsored Research Revenue at Alberta Universities 1991/92 to 1998/99

FIGURE 1

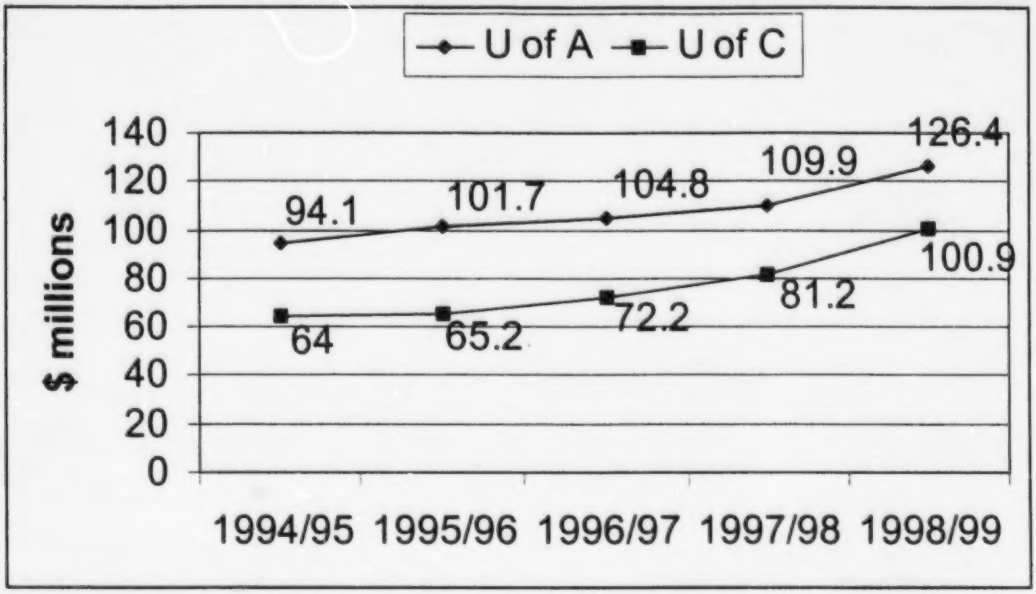


Sources: University of Alberta: Research Grants Office; University of Calgary: Financial Services; University of Lethbridge: Financial Services; Athabasca University: Office of the Vice-President, Academic.

- During fiscal year 1998/99, approximately $230.9 million in direct external funding was received by Alberta's four universities in support of research, a 18.8% increase from 1997/98.
- Total sponsored research funding from all sources to Alberta's university system has been growing by about 9.1% per year for the last 5 years.
- Total research funding to all four Alberta universities per year for the last 5 years is as follows:
  - 1994/95: **$160.7 million**
  - 1995/96: **$169.7 million**
  - 1996/97: **$179.8 million**
  - 1997/98: **$194.4 million**
  - 1998/99: **$230.9 million**

Total Sponsored Research Revenue at U of A and U of C 1994/95 to 1998/99

FIGURE 2



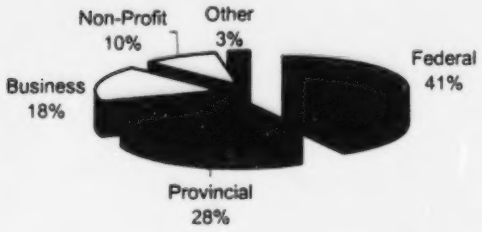
Sources: University of Alberta: Research Grants Office; University of Calgary: Financial Services.

- Total research funding from all sources to the U of A has increased by approximately 34% since 1994/95. The U of C's funding has increased by about 58% during the same period.
- The University of Alberta received approximately $126.4 million in research funding in 1998/99, a 15% increase from the 1997/98 total ($109.9 million).
- The University of Calgary received approximately $100.9 million in research funding in 1998/99, a 24% increase from the 1997/98 total ($81.2 million).
- During fiscal year 1998/99, the University of Lethbridge received approximately $3.3 million and Athabasca University received about $334,000 in support of research. The University of Lethbridge has been successful in consistently increasing their levels of support each year. (see Table 1, pg. 16, for comparative details).

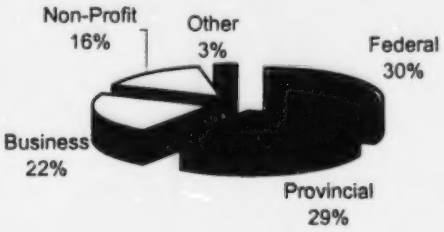
Total Sponsored Research Revenue by Source
1996/97 to 1998/99

FIGURE 3

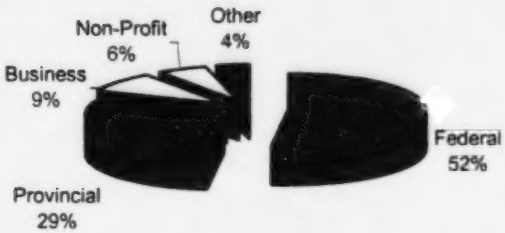
University of Alberta - $126.4 M



University of Calgary - $100.9 M



University of Lethbridge - $3.3 M



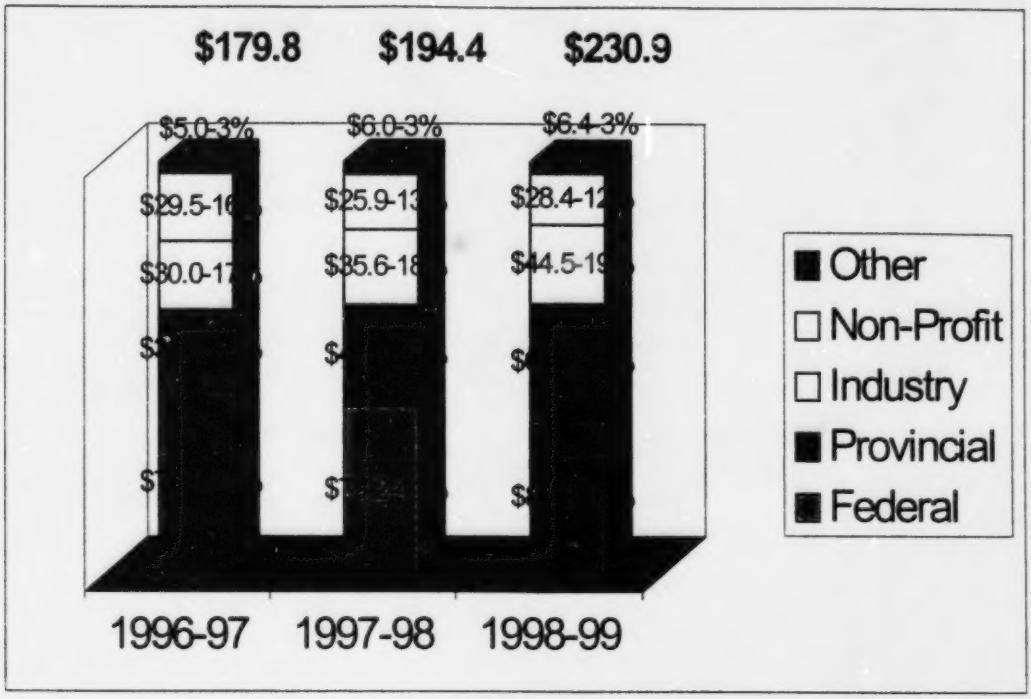
Athabasca University - $0.3 M

Sources: University of Alberta: Research Grants Office; University of Calgary: Financial Services; University of Lethbridge: Financial Services; Athabasca University: Office of the Vice-President, Academic.

- Funding to the University of Alberta from provincial sources was about $35.2 million, an increase of approximately 35.5% from 1997/98, and federal funding was about $53.1 million, an increase of approximately 4.9%.
- Funding to the University of Calgary from provincial sources was about $29.2 million, an increase of approximately 41.2% from 1997/98, and federal funding was about $31.2 million, an increase of approximately 16.7%.
- The University of Lethbridge and Athabasca University underwent fluctuations in levels of government funding (see Table 1, pg. 16, for details). Such fluctuations in federal and provincial funding levels are expected, due to such things as program cycles and the completion of funded research projects.

Total Sponsored Research Revenue by Source
1996/97 to 1998/99

FIGURE 4

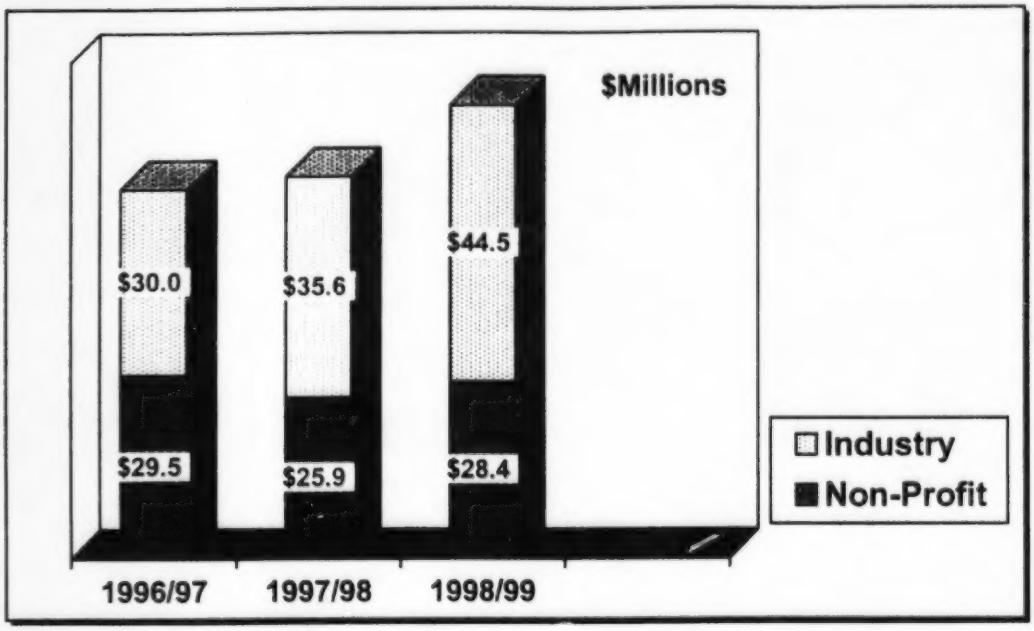


Sources: University of Alberta: Research Grants Office; University of Calgary: Financial Services; University of Lethbridge: Financial Services; Athabasca University: Office of the VP, Academic.

- This indicator shows the increase in total sponsored research funding and the changes within each sector. During fiscal year 1998/99, approximately $230.9 million in direct external funding, in support of research, was received by Alberta's four universities.
- Total sponsored research funding from all sources to Alberta's university system increased by almost 28% between 1996/97 and 1998/99.
- Total sponsored research funding from all sources to Alberta's university system has been increasing each year for the past ten years.

Industry and Non-Profit Organizations
Sponsored Research
1996/97 to 1998/99

FIGURE 5



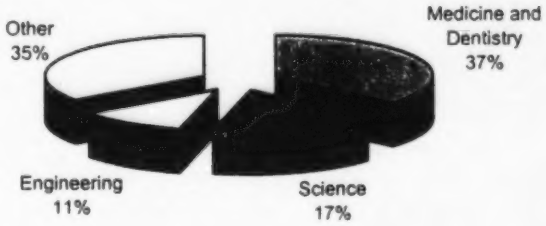
Sources: University of Alberta: Research Grants Office; University of Calgary: Financial Services; University of Lethbridge: Financial Services; Athabasca University: Office of the VP, Academic.

- This indicator shows sponsored research funding levels over time from industry and non-profit sectors. The level of sponsored research funding provided to universities by industry and non-profit sources is an indicator of the relevance and importance of the universities' research effort to the community and business sectors.
- The level of funding provided by the community and business sectors to Alberta universities continues to grow, with these sources making up a combined total of about $73 million of the $230.9 million total sponsored research funding from all sources in 1998/99.
- Industry demonstrated a growing commitment to innovation and economic growth by increasing its investment in research by approximately 48% between 1996/97 and 1998/99.

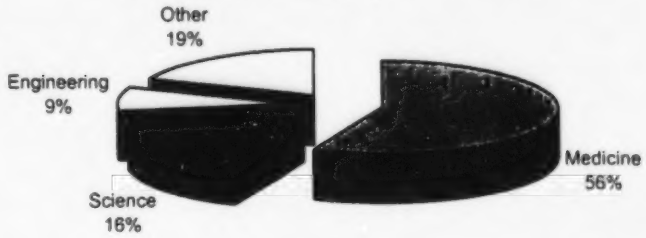
Distribution of Total Sponsored Research Revenue Within U of A, U of C, U of L, and AU 1998/99

FIGURE 6

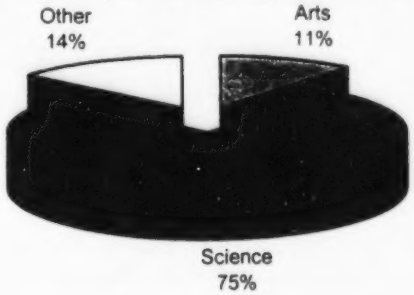
University of Alberta - $126.3 M



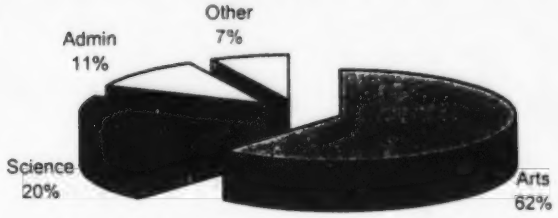
University of Calgary - $100.9 M



University of Lethbridge - $3.3 M



Athabasca University - $0.3 M



Sources: University of Alberta: Research Grants Office; University of Calgary: Financial Services; University of Lethbridge: Financial Services; Athabasca University: Office of the VP, Academic

- At both the University of Alberta and the University of Calgary, the largest proportion of research funding was secured by the Faculties of Medicine (37% at the U of A and 56% at the U of C). At both universities, the Faculties of Science claimed the second largest share of funding (17% at the U of A and 16% at the U of C), followed by the Faculties of Engineering (11% at the U of A and 9% at the U of C). These proportional shares follow a consistent historical pattern.
- The proportional allocation of research funding to faculties at the University of Lethbridge also follows a consistent historical pattern, the greatest share of funding being secured by the Faculty of Science—a share that has increased to 75% in 1998/99 from 64.1% in 1995/96.
- Athabasca University has the majority of sponsored research revenue in the Faculty of Arts (62% in 1998/99)
- It should be noted that funding amounts vary by discipline but the intensity of research in faculties is not necessarily commensurate with monetary allocations to faculties. For example, research activities in the Arts, Humanities, and Social Sciences are less costly to conduct; therefore, the intensity of such research is not necessarily reflected in monetary terms.

Innovation and Science Support for Research at Alberta Universities

The research infrastructure at Alberta universities is supported in part by the provincial government through Alberta Innovation and Science and Alberta Learning. This is done through the use of the following:

- operating grants (Learning)
- Performance Envelope (Learning)
- Intellectual Infrastructure Partnership Program (Innovation and Science)
- Research Excellence Envelope (Innovation and Science)
- Science and Research Fund (ASRA)

It should be noted that operating grants, program and envelope funds are used primarily to support the research infrastructure as opposed to supporting specific research projects. There is, however, a clear link between funding infrastructure and attracting external funding for research activities (i.e., the better the infrastructure, the greater the potential to attract sponsored funding).

The total 1998/99 base operating grant for the three residential universities was about $408.2 million, approximately 40% of which goes to supporting the research infrastructure.

The research component of Learning's Performance Envelope provides additional funding based on the extent to which Alberta universities meet targets on an agreed upon subset of the department's research Key Performance Indicators. This involves comparisons with their respective peer universities and the level of support they received from communities and industries.

- In 1998/99, the three residential universities received $950,000 from the research component of this Envelope.

Starting in 2000/01, the Intellectual Infrastructure and Partnership Program will be amalgamated with the Science and Research Fund into a new Innovation and Science Research Investments Program (ISRIP). It will result in Alberta scientists and researchers having access to a broader pool of funding through a streamlined application process. Funding under this program will be available for science and research initiatives under three distinct funding streams.

1) Research Infrastructure (IIPP)
2) Enabling Research Application and Technology Transfer
3) Science Awareness and Promotion

For 1998/99 and 1999/2000, IIPP and Science and Research Fund totals will continue to be reported separately. The first *Research Funding at Alberta Universities* report that will reflect the Innovation and Science Research Investments Program will be released in 2002.

Note: The IIPP and REE tables in this section show the total funding amounts awarded in 1998/99 and thus differ from the amounts recorded under these categories in Table 1 (pg. 16). These award totals are included in this section of the report to give a sense of the overall 1998/99 funding contribution from these two envelopes to research at Alberta universities.

IIPP and REE revenue recorded in Table 1 (pg. 16) is reported on a cash-flow basis with one modification: that revenues cannot be reported until all partner funding is secured, which is a condition of the IIPP for all projects. This being the case, only projects, which had met this condition in 1998/99, were reported and included in the Table 1 (pg. 16) totals. As other IIPP projects become finalized, future Table 1 (pg. 16) totals will reflect this revenue. The table also reflects CFI revenue, 1997/98 was the first year that these were reported—albeit there were no 1997/98 revenues to report from this source.

The Science and Research Fund revenue is also included in this year's report on the same modified cash-flow basis as described above. This source is also contained in 1997/98 totals (Table 1, pg. 16), but is reported as part of "Other."

Intellectual Infrastructure Partnership Program (IIPP)
Begun in 1997 with funding of $15 million per annum, which was expanded to a total of $75 million over 5 years, the IIPP is designed to increase research excellence and competitiveness of Alberta universities and research hospitals by investing strategically in their research infrastructure. Major objectives of the IIPP are to promote high quality university research through the development of institutional and collaborative centres of research excellence, and to encourage projects that strengthen the research infrastructure in areas of strategic importance to the province. A key objective of the IIPP is to help Alberta universities attract and retain high quality faculty and graduate students. The program funds, on average, 40% of total project costs and is designed to attract both private sector investment and Canada Foundation for Innovation funding. Partner funds come from various sources, such as the Canada Foundation for Innovation (CFI), the Alberta Heritage Foundation for Medical Research (AHFMR), and the Alberta Science and Research Authority (ASRA). Significant funds are also contributed by business and industry sources, non-profit sources, the universities, and other government sources.

In 1998/99, the IIPP allocated $3.0 million in Small Equipment Grants (equipment valued at under $350,000). Another $37.0 million was committed for sixteen projects over the next 3 years under the IIPP Strategic Development Program ($19.9 million was allocated in 1998/99.) All projects funded in 1998/99 are listed in Table 2 (pg. 17).

1998/99 Strategic Development Program Awards (IIPP)	
University of Alberta	**8,544,236**
University of Calgary	**7,854,200**
University of Lethbridge	**3,483,000**
Athabasca University	**Nil**

Research Excellence Envelope (REE)
Begun in 1996 with $2 million per annum, which was increased to $3.5 million in 1997, the REE is designed to reward and foster sustained research excellence at Alberta universities through providing funding to help recruit and retain high quality researchers and graduate students in areas of identified strengths. REE funds are allocated to the universities on the basis of a formula that recognizes the success of researchers in receiving federal granting council awards and the number of faculty per institution. Funds are then allocated internally by the universities and are used for research infrastructure enhancements such as equipment and labs, as well as for other costs related to research, including support for graduate students or associates involved in the research programs of the targeted researchers.

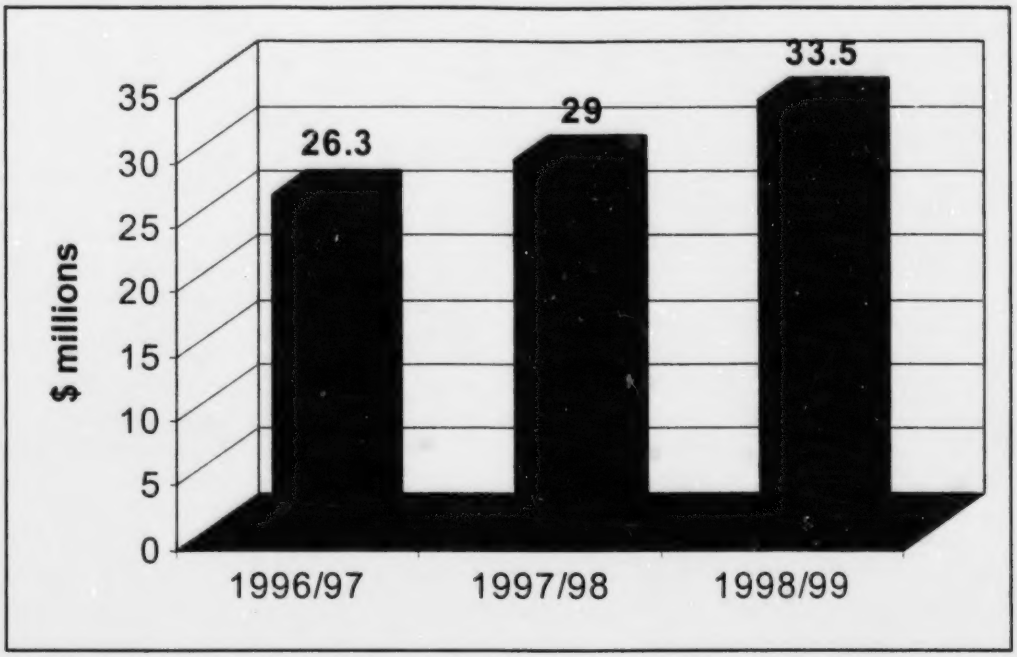
The following table shows the breakdown for the 1998/99 REE grant, including the number of researchers awarded.

1998/99 REE Grant		
Institution	**REE Grant**	**Awardees**
University of Alberta	$1,926,212	56
University of Calgary	$1,308,778	70
University of Lethbridge	$210,000	30
Athabasca University	$55,010	23
TOTAL	**$3,500,000**	**179**

- REE funds were allocated across the spectrum of faculties at all universities. The faculties of medicine, science, and engineering received the largest shares and targeted the greatest number of researchers.
- Other funds used in conjunction with REE funds were from many sources: the universities, the federal granting councils, other provincial sources such as the Alberta Heritage Foundation for Medical Research (AHFMR), and both the non-profit and private sector.

Alberta Heritage Foundation for Medical Research (AHRMR)
1996/97 to 1998/99

FIGURE 7



Sources: University of Alberta: Research Grants Office; University of Calgary: Financial Services; University of Lethbridge: Financial Services.

- The AHFMR supports Alberta-based medical research through providing equipment grants, establishment grants to help researchers with new research programs, and through funding for other aspects of medical research.
- AHFMR's support and leadership has resulted in millions of dollars of support to Alberta universities and research hospitals, and has enabled Alberta to become one of the ten top medical research centres in North America.
- Since 1996/97, AHFMR support to Alberta's universities has been increasing by about 13% per year. (see Table 1, pg. 16, for comparative details).
- During fiscal year 1998/99, the AHFMR provided approximately $17.2 million to the U of A, $16.1 million to the U of C, and $220,000 to the U of L.

Commercialized Research Revenue
1998/99

Both the University of Alberta and The University of Calgary generate funding through the activities of their respective technology transfer organizations. The impact of university research is reflected in the successes of these organizations, in the growing number of licenses generating revenue, royalty revenues and spin-off companies. These successes give a sense of one of the impacts of university research as it is applied and transferred to business and industry.

The University of Alberta

The University of Alberta's Industry Liaison Office (ILO) brought in over $3.8 million in licensing revenues for 1998/99—the highest of any Canadian university and among the top 25 in North America. The majority of this revenue goes back into funding research activities.

Other ILO commercialization achievements in 1998/99 are as follows:

- 59 new Reports of Invention were submitted;
- 14 patent applications were filed or continued;
- 257 licenses, options or agreements were signed;
- 48 active spin-off companies

The U of A's rate of spin-off company creation is among the highest in North America and these spin-off companies hold more than 250 issued patents.

The University of Calgary

The University of Calgary's wholly owned technology transfer company, University Technologies International Inc. (UTI), ranks second among Canadian universities generating royalty revenues from licensed technologies. In 1998/99, UTI distributed $2.8 million in royalties.

In addition, UTI attracted $270,000 in Product Development Agreements to the U of C and contributed $45,000 directly in post-graduate fellowships.

Also in 1998/99, UTI:

- executed 29 new deals;
- created three start-up company;
- reported having 84 licenses generating revenue from its portfolio of more than 300 patents.

Note: Through a formal letter of agreement between the University of Lethbridge and University Technologies International Inc., U of L researchers are able to access UTI's technology commercialization services.

Research Revenue from Investment Earnings, Networks of Centres of Excellence, and Clinical Trials. 1998/99

Reporting Standards:

- The universities follow common approaches to most of their reporting. There are, however, a number of complexities that are receiving attention from the universities to explore standardized reporting for improved comparability. These include: investment earnings (primarily endowment) allocated to research expenditure, Networks of Centres of Excellence revenue, and clinical trials funding.
- Although attempts to standardize the reporting of these sources is ongoing, differing situations at the University of Alberta and the Univers..y of Calgary make reporting these three sources in the same manner particularly difficult. In the interim, the explanatory notes and revenues recorded below have been included in this year's report for two reasons: to ensure that this report is as inclusive of all research revenue as possible, and to allow for a comparable overview of the significant revenues derived from these three sources at the U of A and the U of C.

The University of Alberta

Investment Earnings from Endowments

- In 1998/99, investment earnings from endowments totaling $12,986,000 were allocated for research spending but are not included in the Sponsored Research Revenue.
- Before allocating any portion of the endowment earnings for research spending, the University of Alberta normally capitalizes (re-invests) approximately half the gross returns. In 1998/99, however, given unusually high net returns, it capitalized a significant additional amount for which there was no immediate spending need. While this was initially recognized as available for spending, because it was not so allocated, it has not been included as Sponsored Research Revenue. The additional net investment earnings for research capitalized in 1998/99 totaled $15,894,000.

Networks of Centres of Excellence (NCEs)

- As of 1998/99, the Sponsored Research Revenue Report includes Net University of Alberta revenue only (gross revenue was reported in prior years). The net NCE revenue in 1998/99 was $5,155,000.

Clinical Trials

- Virtually all funds for clinical trials are received, held, and administered by the Capital Health Authority, with a small portion administered by the Alberta Cancer Board.
- Revenues for clinical trials reported by the Capital Health Authority and Alberta Cancer Board bring the total estimated clinical trials revenue for the University of Alberta to $11 million for 1998/99 and is included in sponsored research revenue.

The University of Calgary

Investment Income

- In addition to the $100.9 million in sponsored research funding received during the year ending March 31, 1999 (see Table 1, pg. 16), the U of C allocated $6.9 million of investment income to research activities.

Networks of Centres of Excellence (NCEs)

- The U of C is responsible for administering a Network of Centres of Excellence (NCE) that provides grants to researchers at universities across Canada. Funding for the NCE is provided by the Natural Sciences and Engineering Research Council (NSERC) and the Medical Research Council (MRC).
- The majority of the research grants are awarded to individuals at other universities. Accordingly, the funding provided to administer the NCE ($5.0 million for the year ending March 31, 1999) is not included as sponsored research (i.e. not included in Table 1, pg. 16).

Clinical Trials

- The U of C has entered into an agreement with the Calgary Regional Health Authority with respect to the administration of industry sponsored, patient-based clinical research. Under this agreement, the researcher has the option of administering the financial resources of each individual clinical trial through the financial system of either the University of Regional Health Authority, regardless of the physical location where the clinical trial is held. To date, the majority of these clinical trials are administered through the University's financial system.
- The total clinical trial revenue for the year ended March 31, 1999, included as sponsored research is $8.36 million.

TABLE 1: **Sponsored Research Funding Revenue (in thousand dollars)**

SOURCES		RECIPIENT	1996-97	1997-98	1998-99
FEDERAL GOVERNMENT	NSERC	Alberta	24,842	25,701	25,719
		Calgary	12,653	11,616	13,050
		Lethbridge	965	1,172	1,189
		Athabasca	24	22	29
	SSHRC	Alberta	3,711	4,043	2,788
		Calgary	934	909	1,157
		Lethbridge	247	98	73
		Athabasca	182	163	81
	MRC	Alberta	15,675	16,259	16,887
		Calgary	11,877	11,211	12,345
		Lethbridge	76	110	143.5
		Athabasca	0	0	0
	CFI	Alberta	Reporting this source begins in 1997-98	0	585
		Calgary		0	1,093
		Lethbridge		0	0
		Athabasca		0	0
	OTHER	Alberta	5,253	4,582	7,090
		Calgary	3,052	2,992	3,543
		Lethbridge	51	137	302
		Athabasca	205	212	97
	Subtotal	Alberta	49,481	50,585	53,069
		Calgary	28,516	26,728	31,187
		Lethbridge	1,338	1,517	1,707.5
		Athabasca	411	397	207
ALBERTA GOVERNMENT	AHFMR	Alberta	13,370	15,317	17,207
		Calgary	12,613	13,572	16,064
		Lethbridge	271	160	220
		Athabasca	0	0	0
	IIPP	Alberta	Reporting this source begins in 1997-98	1,320	2,442
		Calgary		2,927	8,976
		Lethbridge		332	180
		Athabasca		42	47
	REE	Alberta	Reporting this source begins in 1997-98	1,889	1,926
		Calgary		1,353	1,309
		Lethbridge		210	210
		Athabasca		48	55
	S&R FUND - ASRA	Alberta	Reporting for this source begins in 1998-99		1,662
		Calgary			420
		Lethbridge			0
		Athabasca			0
	OTHER	Alberta	6,499	7,449	11,949
		Calgary	2,510	2,795	2,394
		Lethbridge	227	272	358
		Athabasca	13	14	21
	Subtotal	Alberta	19,869	25,975	35,186
		Calgary	15,123	20,647	29,163
		Lethbridge	498	974	968
		Athabasca	13	104	123
OTHER GOVERNMENT		Alberta	1,725	2,433	2,538
		Calgary	484	721	884
		Lethbridge	29	30	83
		Athabasca	58	69	0
BUSINESS		Alberta	14,075	16,494	22,427
		Calgary	15,948	19,050	21,740
		Lethbridge	21	59	303.5
		Athabasca	5	5	4
NON-PROFIT		Alberta	18,909	13,800	12,325
		Calgary	10,352	12,022	15,887
		Lethbridge	316	108	191
		Athabasca	0	0	0
OTHER		Alberta	782	639	823
		Calgary	1,809	2,014	2,074
		Lethbridge	30	29	42
		Athabasca	0	0	0
TOTAL Note: Totals may not add due to rounding		Alberta	104,841	109,926	126,368
		Calgary	72,232	81,182	100,935
		Lethbridge	2,232	2,717	3,295
		Athabasca	487	575	334
		[illegible]	[illegible]	[illegible]	[illegible]

Sources: The University of Alberta: Research Grants Office; The University of Calgary: Financial Services; The University of Lethbridge: Financial Services; Athabasca University: Office of the Vice-President, Academic.

TABLE 2: **IIPP Committed Project List 1998/99 to 2001/02**

	IIPP Award Amount	Total Project Cost	Award of Total Cost
University of Alberta			
1 Ultrahigh Vacuum Surface Analysis Facility	$ 704,000	$ 1,760,000	40%
2 Geotechnical and Geoenvironmental Cold Regions Research Facility	$ 250,000	$ 326,000	77%
3 Electrical and Computer Engineering Research Facility (ECERF)	$ 1,200,000	$ 10,500,000	11%
4 Modern Infrastructure for Advanced Capabilities in Molecular Biology and Biotechnology	$ 1,305,690	$ 3,636,387	36%
5 Computing Science Research Laboratory and Space	$ 1,600,000	$ 7,008,000	23%
6 Food for Health Innovations	$ 2,939,000	$ 7,348,000	40%
7 Confocal/Multiphoton Imaging Facility	$ 341,663	$ 976,181	35%
8 Institute of Biomolecular Design (IBD)	$ 3,900,000	$ 19,872,956	20%
University of Calgary			
9 Calgary Centre for Innovative Technology (CCIT)	$ 14,000,000	$ 40,000,000	35%
10 Electron Beam Facility for High Resolution Imaging and Micro-Analysis	$ 800,000	$ 2,030,000	39%
11 Electron Probe Microanalyzer	$ 478,000	$ 1,196,000	40%
12 Assessment of Major Biogeochemical Cycles Using Stable Isotope Techniques	$ 199,000	$ 497,000	40%
13 Collaborative Earth and Environment Science Research Initiatives	$ 200,000	$ 500,000	40%
14 Two-Photon Laser Scanning Conofocal Microscope	$ 177,200	$ 601,444	29%
University of Lethbridge			
15 Science Annex	$ 1,544,000	$ 3,087,000	50%
Universities of Alberta, Calgary, and Lethbridge			
16 Multimedia Advanced Computational Infrastructure (MACI-2)	$ 4,360,000	$ 16,040,000	27%